



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
|-----------------|-------------|----------------------|---------------------|------------------|

10/676,577

09/30/2003

Hong Jiang

42P17511

7893

7590 08/03/2007
Chui-Kiu Teresa Wong
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP
Seventh Floor
12400 Wilshire Boulevard
Los Angeles, CA 90025-1026

EXAMINER

WONG, ALLEN C

ART UNIT

PAPER NUMBER

2621

MAIL DATE

DELIVERY MODE

08/03/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/676,577

Applicant(s)

JIANG, HONG

Examiner

Allen Wong

Art Unit

2621

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 May 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 5/11/07 have been fully read and considered but they are not persuasive.

Regarding lines 10-14 on page 11 of applicant's remarks, applicant states that the objection to the specification should be withdrawn since it is optional to use "Summary of the Invention". Although it would be convenient to have the subtitle "Summary of the Invention" for the ease of reading the application, however, the objection is withdrawn.

Regarding lines 15-19 on page 11 of applicant's remarks, applicant states that the 35 U.S.C. 101 should be withdrawn for claims 19-24. Applicant has amended claim 19, however, the applicant did not include "computer executable instructions" or "computer program executable instructions" in the preamble. In order to comply with today's 35 U.S.C. 101 statutory requirements, applicant needs to rewrite the preamble of claim 19 to specifically state "a computer-readable medium *encoded with* a computer program executable instructions for..."

Regarding lines 1-10 and 14-15 on page 12 of applicant's remarks about claim 1, applicant contends that Hanami does not disclose "a motion measurement on a plurality of motion search points that form a rectangular search region, wherein a minimal motion search point among the plurality of motion search points is found based on result of the motion measurement". The examiner respectfully disagrees. Hanami discloses the concept of motion estimation to ascertain the optimum motion vector in that a search

Art Unit: 2621

process is initiated for finding optimal motion vectors by applying measuring prediction block error to obtain a mean square error (MSE) or sum-of-absolute-differences (SAD) between the predicted and actual pixel values over all pixels of the motion-compensated region. In other words, calculation of the block prediction error for each motion vector within a certain search range is done, and then, the optimal motion vector is picked from a plurality of values from the search process, ie. full pixel search, half pixel search, in that a search region(s) is applied in that the search region is can be defined in any shape, square, rectangular, or any other user-defined search region, wherein that search region definitely has a minimum search point to initiate the search for the optimum motion vector(s). Hanami 's figure 1 discloses ascertaining a minimum motion search point for obtaining the estimated optimum motion vector from plural candidate motion vectors, where X is from current frame data and Y is from reference frame data, and wherein figure 5, Hanami discloses the existence of the inner region 20 of the rectangular search area 22 that have horizontal dimensions ranging from $-t_2$ to $+t_1$, and vertical dimensions ranging from $-r_2$ to $+r_1$, in that a minimum search point exists within the search region as defined in Hanami to initiate the search for the optimum motion vector(s). Thus, Hanami discloses "a motion measurement on a plurality of motion search points that form a rectangular search region, wherein a minimal motion search point among the plurality of motion search points is found based on result of the motion measurement".

Claims 4, 7, 15, 19 and 25 are rejected for at least similar reasons as claim 1 as explained above and in the rejection. Claims 2, 3, 5, 6, 8-14, 16-18, 20-24 and 26-29 are rejected for at least similar reasons as stated above and in the rejection below.

Regarding line 9 and lines 14-17 on page 13 of applicant's remarks about claim 8, applicant asserts that Hanami does not disclose "repositioning the search region to be substantially centered on the minimal motion search point... if the minimal motion search point is along an edge or at a corner of the rectangular search region..." The examiner respectfully disagrees. In column 18, lines 34-47, Hanami discloses the search area or window can be shifted or repositioned in that search block 42c is arranged on the lowermost area of the search window, implicating the search point can be substantially along the edge or at the corner of the rectangular search region. Further, Hanami discloses that the search region can be adjusted to be repositioned with dimensions, as specified in figure 5, the inner region 20 of the rectangular search area 22 with horizontal dimensions ranging from $-t2$ to $+t1$, and vertical dimensions ranging from $-r2$ to $+r1$. Also, column 12, lines 38-43, Hanami discloses that the search area can be widened or repositioned to substantially adjust the dimensions for optimally ascertaining the best motion vector value data. Thus, claim 8 is disclosed.

Regarding the bottom of page 13 to line 1 and lines 4-8 on page 14 of applicant's remarks about claim 10, applicant states that Hanami does not disclose "dividing the rectangular search region into a plurality of data units having substantially the same size and a distinct subset of the plurality of motion search points, wherein the motion measurement is performed in each of the plurality of data units one by one". The

Art Unit: 2621

examiner respectfully disagrees. The rectangular search region as applied in Hanami is divided into multiple data units that have substantially the same size and different subset of plural motion search points. See column 18, lines 35-61, Hanami discloses that the search regions can be divided into multiple data units or multiple pixilated units wherein each of the pixilated data units can have substantially similar size and different motion search points to search for optimal motion vectors. Thus, Hanami meets the limitations of claim 10.

Regarding line 16 and lines 21-25 on page 14 of applicant's remarks about claim 13, applicant mentions that Hanami does not disclose shrinking the rectangular search region at the minimal motion search point is within the inner region of the rectangular search region. The examiner respectfully disagrees. In figure 61 and column 38, lines 18-45, Hanami discloses that the rectangular search region can be shrunked or decreased in size for pinpointing the location of the optimal motion vector value within the inner region, wherein rectangular region 61 can be reduced to the region 170 that encompasses the evaluation point 162. Thus, Hanami meets the limitations of claim 13.

In conclusion, the rejection is maintained.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV, reads as follows:

Art Unit: 2621

Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific data manipulation functions." The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) "Nonfunctional descriptive material" includes but is not limited to music, literary works and a compilation or mere arrangement of data.

When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare *In re Lowry*, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994) (claim to data structure stored on a computer readable medium that increases computer efficiency held statutory) and *Warmerdam*, 33 F.3d at 1360-61, 31 USPQ2d at 1759 (claim to computer having a specific data structure stored in memory held statutory product-by-process claim) with *Warmerdam*, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory).

In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See *Lowry*, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

Claims 19-24 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claim 19 defines a "machine-accessible medium that provides instructions that..." embodying functional descriptive material. However, the claim does not define a computer-readable medium or memory and is thus non-statutory for that reason (i.e., "When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized" – Guidelines Annex IV). That is, the scope of the presently claimed "a machine-accessible medium that provides instructions that..." can range from paper on which the program is written, to a program simply contemplated and memorized by a person. The examiner suggests amending the claim to embody the program on "computer-readable medium" or equivalent in order

to make the claim statutory. Any amendment to the claim should be commensurate with its corresponding disclosure.

An acceptable claim preamble would be "a computer-readable medium *encoded with* a computer program executable instructions for..."

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Hanami (6,122,317).

Regarding claims 1 and 4, Hanami discloses a video encoder comprising:

a motion estimator to perform a motion search on input video data relative to a reference video frame to generate a plurality of motion vectors, the motion search comprises a rectangular motion search (fig.1, note the optimum motion vector is estimated from plural candidate motion vectors, where fig.5 discloses the rectangular motion search are is used with horizontal dimensions ranging from -t2 to +t1, and vertical dimensions ranging from -r2 to +r1) including

a motion measurement on a plurality of motion search points that form a rectangular search region, wherein a minimal motion search point among the plurality of motion search points is found based on result of the motion measurement (fig.1, Hanami discloses obtaining a minimum motion search point for obtaining the estimated

optimum motion vector from plural candidate motion vectors, where X is from current frame data and Y is from reference frame data, where in fig.5, there is the inner region 20 of the rectangular search area 22 with horizontal dimensions ranging from -t2 to +t1, and vertical dimensions ranging from -r2 to +r1); and

a variable length coder to compress the input video data using the motion vectors (fig.2, element 7 compresses motion vectors data mvA and mvB).

Regarding claims 2 and 5, Hanami discloses a transformer (fig.84, element 926) and a quantization unit (fig.84, element 928).

Regarding claims 3 and 6, Hanami discloses a frame memory to store reference frame (fig.4, element 12).

Regarding claims 7, 19 and 25, Hanami discloses a computer readable medium, a system, and a method to determine relative movement of a pixel block from a first video frame to a second video frame, the method comprising:

performing a motion measurement on a plurality of motion search points that form a rectangular search region (fig.5 discloses the rectangular motion search are is used with horizontal dimensions ranging from -t2 to +t1, and vertical dimensions ranging from -r2 to +r1, where there are a plurality of motion search points or pixels);

finding a minimal motion search point among the plurality of motion search points based on result of the motion measurement (fig.1, note the optimum motion vector is estimated from plural candidate motion vectors, where fig.5 discloses the rectangular motion search are is used with horizontal dimensions ranging from -t2 to +t1, and

Art Unit: 2621

vertical dimensions ranging from $-r2$ to $+r1$ to obtain a minimum motion search point);
and

finding a motion vector corresponding to the relative movement of the pixel block from the first video frame to the second video frame if the minimal motion search point is within an inner region of the rectangular search region (fig.1, Hanami discloses obtaining a minimum motion search point for obtaining the estimated optimum motion vector from plural candidate motion vectors, where X is from current frame data and Y is from reference frame data, where in fig.5, there is the inner region 20 of the rectangular search area 22 with horizontal dimensions ranging from $-t2$ to $+t1$, and vertical dimensions ranging from $-r2$ to $+r1$).

Note claims 8-14, 20-24 and 26-29 have similar corresponding elements.

Regarding claim 15, Hanami discloses a method to compress video data comprising:

defining a first video frame as a reference video frame (fig.1, element Y is from the reference frame data);

performing a motion search on a second video frame relative to the reference video frame to determine a plurality of motion vectors of the second video frame relative to the reference video frame (fig.1, note the optimum motion vector is estimated from plural candidate motion vectors); and

reducing the video data to the reference video frame and the plurality of motion vectors of the second video frame, wherein the motion search includes performing motion measurement on a plurality of motion search points that form a rectangular

search region within a pixel block (fig.5 discloses the rectangular motion search are is used with horizontal dimensions ranging from $-t_2$ to $+t_1$, and vertical dimensions ranging from $-r_2$ to $+r_1$, where there are a plurality of motion search points or pixels, and that element X is from current frame data);

finding a minimal motion search point among the plurality of motion search points based on result of the motion measurement (fig.1, note the optimum motion vector is estimated from plural candidate motion vectors, where fig.5 discloses the rectangular motion search are is used with horizontal dimensions ranging from $-t_2$ to $+t_1$, and vertical dimensions ranging from $-r_2$ to $+r_1$ to obtain a minimum motion search point); and

finding a motion vector corresponding to the relative movement of the pixel block from the first video frame to the second video frame if the minimal motion search point is within an inner region of the rectangular search region (fig.1, Hanami discloses obtaining a minimum motion search point for obtaining the estimated optimum motion vector from plural candidate motion vectors, where X is from current frame data and Y is from reference frame data, where in fig.5, there is the inner region 20 of the rectangular search area 22 with horizontal dimensions ranging from $-t_2$ to $+t_1$, and vertical dimensions ranging from $-r_2$ to $+r_1$).

Note claims 16-18 have similar corresponding elements.

Conclusion

2. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

Art Unit: 2621

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

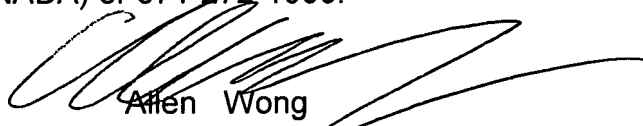
Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen Wong whose telephone number is (571) 272-7341. The examiner can normally be reached on Mondays to Thursdays from 8am-6pm Flextime.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John W. Miller can be reached on (571) 272-7353. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2621

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Allen Wong
Primary Examiner
Art Unit 2621

AW
8/2/07